

ABANDONED URANIUM MINES PROJECT ATLAS

EXECUTIVE SUMMARY

BACKGROUND

The U.S. Environmental Protection Agency (USEPA) Region 9 Abandoned Uranium Mines Project began following a U.S. Congressional Committee study and hearings held in 1993¹. The Navajo Nation presented testimony concerning abandoned uranium mines and requested assistance in determining if the old mines posed a health risk to residents. The USEPA presented testimony to describe its federal authority under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and how the USEPA could assist the tribe. The U.S. Department of Energy (USDOE) and the U.S. Department of Interior (USDOI), the Navajo Nation Environmental Protection Agency (NNEPA) and the Navajo Nation Abandoned Mine Lands Reclamation Department (NNAMLRD) also participated in the hearings.

In 1994, USEPA Region 9 investigated the abandoned uranium mines in the King Tutt Mesa study area located in the Red Valley Chapter of the Navajo Nation. The investigations were conducted with the assistance of the NNEPA Superfund Program, Bechtel Environmental, and the USDOE Remote Sensing Laboratory. In June 1997, the USEPA Region 9 and Bechtel Environmental issued a draft document² for comment. From the King Tutt Mesa study, a three-step process was developed for investigating other areas with abandoned uranium mines.

1. Conduct aerial (helicopter) radiation surveys to locate the sources of radiation in the areas of old mines.
2. Test the water used for human consumption in the areas of old mines.
3. Survey homes to determine if they were constructed with radioactive materials from the mines.

Various planning materials were collected and reviewed prior to extending the project. Numerous historical records and reports of mining activity in the Navajo Nation were assembled. The results of studies of similar environmental situations in other mining areas were reviewed. These were combined with the lessons learned from the King Tutt Mesa study to expand the project to other mining areas across the Navajo Nation. Through Interagency Agreements with USDOE and the USACE, senior scientists and field personnel brought expert technologies for surveys and sampling to six mining districts known to be areas of historical mining and exploration for uranium:

Four Corners
Monument Valley
Cameron-Tuba City
Bidahochi
Central Area
Chinle

The USDOE Aerial Measuring System (AMS) survey capability was used to measure and map radiation sources within known uranium mining areas. The same type of helicopter surveys that were used in 1994 in the Four Corners Area were conducted in 1997, 1998 and 1999 in the other areas. A project total of 1,144 square miles were surveyed. In March 1998 the USACE joined the project to investigate water used for human consumption and home construction using mine waste rock in the areas of the old uranium mining activities.

The lead agency was the USEPA Region 9, with Patti Collins as the Project Manager-Senior Scientist and Vicki Rosen as the Community Involvement Coordinator. Working with the USEPA were agencies including NNEPA, NNAMLRD, USDOE, and USACE, as well as academic and scientific institutions.

ABANDONED URANIUM MINES PROJECT - DATA COLLECTION

Purpose

The purpose of the Abandoned Uranium Mines Project was to identify the radiation sources, characterize the exposure, and recommend methods to reduce radiation exposure from abandoned uranium mines on the Navajo Nation.

Providing education and outreach about radiation, and working with individual communities living in proximity to the abandoned mines, was also an important component of the project. In order for the Abandoned Uranium Mines Project to succeed, it was necessary to involve the affected communities and to engage them as active community partners. An important objective of the project was to develop an outreach strategy that would result in a two-way sharing of information. This involved educational efforts to increase understanding and awareness of the mines and their possible effects, as well as engaging the participation of Chapter Officials to assist in identifying water sources used for human consumption and homes that should be surveyed.

A preliminary technical objective of the project was to determine where the old uranium mines were located. Historical maps and records were researched to identify possible mine locations. Aerial helicopter radiation surveys were flown to measure radiation over suspected mining areas in order to locate the current sources of radiation.

¹ The July 1993 Congressional Committee report was titled “Deep Pockets: Taxpayer Liability for Environmental Contamination”. Subsequent Congressional hearings were held on November 4, 1993.

² USEPA Region 9 Superfund Division, 1997. Integrated Assessment, Draft for Comment, Navajo Uranium Mines-King Tutt Mesa Study Area, Red Valley Chapter, Navajo Nation, Oak Spring, New Mexico 87420, Site EPA ID Number: NND 986667434

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EXECUTIVE SUMMARY (continued)

To evaluate risks to human health by ingestion of stable and radioactive metals in water, a sampling program was designed to measure analyte concentrations in water sources used for human consumption. The sampling program consisted of collecting one water sample at each well, tap, spring, or tank identified by local Chapter Officials as a source used for human consumption. All samples were collected as a point-of-use sample designed to duplicate the most likely method in which a person would obtain water for human consumption. If there was a common source for multiple users, such as a community well or tap, only the common source location was sampled.

The Data

From 1994 to 2000, USEPA Region 9 brought the project to approximately 30 chapters on the Navajo Nation. Outreach materials in the form of simple flyers and photographs were distributed to the chapter houses and trading posts. Maps were developed from the aerial surveys to show radiation contours, water-sampling results and risk analysis. These maps were provided to, and reviewed with, Chapter Officials. Several presentations on uranium, the mines and the environment were given at schools throughout the Navajo Nation. Presentations with more technical content were given to several science classes to teach about the project and how the water sampling was performed. A coloring book titled "Gamma Goat - The Dangers of Uranium" was created to teach the younger children about uranium mines and radiation.

Aerial radiological surveys of 41 uranium mining areas (1,144 square miles) within the Navajo Nation were conducted during the period from October 1994 through October 1999. The USEPA Region 9 funded the surveys and the USDOE Remote Sensing Laboratory in Las Vegas, Nevada conducted the aerial surveys. The aerial survey data were used to characterize the overall radioactivity and excess Bismuth²¹⁴ levels within the surveyed areas. Bismuth²¹⁴ is an indicator of uranium ore deposits and/or uranium mines. Identifying current radiation source areas was useful for designing field sampling plans for water and home surveys.

The USACE identified many radiation sources, sampled water used for human consumption, and conducted home surveys. Between June 1998 and January 2000 the USACE field investigations included 227 water samples, 27 Quality Control Samples (of which 14 were field blanks and 13 were duplicates), 28 home surveys, and 34 radiation surveys. The home surveys are not presented in this Atlas.

In January 2000, Michael Feeley (Deputy Director of the USEPA Region 9 Superfund Program) initiated demobilization of the field team. The demobilization was based on a request from Derrith Watchman-Moore, Executive Director of the NNEPA to cease all visits to tribal chapters. The project team began demobilization of all field activities including sampling and communications. The demobilization was completed January 31, 2000. Subsequently all aspects of the project began close-out activities leading to the summarization and distribution of the data collected between 1994 and 2000. These close-out activities included archiving all of the scientific information collected for the project and development of this Project Atlas.

PROJECT ATLAS

The Abandoned Uranium Mines Project Atlas was designed to provide the user with an overview of the project and the water and aerial radiation data that were collected for the project. The maps in the overview section of the Atlas provide a regional view of the Navajo Nation. For each survey area, the Atlas provides contour maps that depict where gross count and Bismuth²¹⁴ radiation were measured from the aerial radiation surveys conducted during the period October 1994 through October 1999. The Atlas is also a compilation of data tables and reference maps that reflect field information, laboratory analytical results (stable and radioactive metals), and basic risk information associated with water samples collected between June 1998 and January 2000 from water sources within the Navajo Nation. Finally, the Atlas appendices provide the user with summary descriptions of the history, data collection, data management and community involvement activities associated with the project. A list of references is included in Appendix F for users who are interested in additional information about this and related projects. These references are available through the USEPA Region 9 Superfund Records Center.



Monument Valley